to the spurs. A necrosis, found at the point of attachment of stem to fruit, could be associated with no growth factor except drought during the summer.

A pedicel disorder, attributed to sprays of 2, 3, 5–triiodobenzoic acid (TIBA) has been reported on Golden Delicious (5). The disorder, obviously very similar to the type found in Rio Negro Valley, appeared about 6 weeks after applications of 25 to 50 ppm made 4 weeks past bloom. The lesions often completely girdled the pedicels, and fruit enlargement was inhibited.

Another disorder attributed to the spray treatments with TIBA was fruit pitting, described as indistinguishable from bitter pit. The appearance of the pitting observed by Stahly and Williams (5) may confirm that the pedicel girdling they described was a result of a moisture deficiency or stress. Several authors (2, 3, 4) suggest moisture stress in tree and fruit as a cause of fruit pitting.

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'Thornfree' Blackberry in Illinois

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'Thornfree,' a semi-upright thornless blackberry, was introduced in 1966 by D. H. Scott and D. P. Ink, Crops Research Division, U. S. Department of Agriculure, Beltsville, Maryland. The cultivar has been outstanding in Illinois tests for several years, beginning with a planting as a selection in 1964.

Performance data from plantings established in 1965 at the Pomology Research Center, Urbana, and at the Dixon Springs Agricultural Center (DSAC), Simpson, are summarized in Table 1. The yields are averages of 5 plants spaced 4 feet apart in rows 6 feet apart at Dixon Springs and 6 feet apart in rows 10 feet apart at Urbana, all trained to a 2-wire vertical trellis. A sawdust mulch was used at Dixon Springs. The canes over-wintered on the ground each year at Urbana and in 1966 at Dixon Springs. In 1967 and 1968 the canes remained tied to the trellis throughout the winter at Dixon Springs.

At both locations, the plants were relatively slow in becoming established, and no fruit records were obtained in 1966, although some fruit was produced. Once the plants became established they were vigorous and semi-upright, needing support on a trellis or stake. Many of the primocanes were 8 to 10 feet or more in length, and 1 to 1½ inches in diameter at the base.

The fruit matured during late summer, about a month later than 'Dar-

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Table 1. Performance of 'Thornfree' blackberry in central and southern Illinois, 1967-69.

Location	Year	Yield per plant (qts.)	Berry size (grams per berry)	Harvest period
Central[a] Illinois	1967	8.1	3.52	7-27 to 9-5
	1968	2.6	4.35	7-30 to 9-3
	1969	15.2	4.71	7-31 to 9-12
Southern[b] Illinois	1967	13.9	3.77	7-19 to 8-28
	1968	10.5	4.64	7-15 to 8-21
	1969	16.3	3.85	7-23 to 8-25

[a]Pomology Research Center, Urbana.
[b]Dixon Springs Agricultural Center, Simpson.

Fig. 1. 'Thornfree' plant trained to a single stake at the Pomology Research Center, Urbana, Illinois.

row' and the early wild types. Berries were large, fairly firm, blunt-conic shape, of tart flavor, and borne on fruiting laterals having as many as 30 to 40 fruits each. Fruit maturation extended over a fairly long period with 35 to 40 days between the first and last pickings. Yields were generally good at both locations but consistently better at Dixon Springs. The yields at Urbana reflected some winter injury each year and rather severe injury during the 1967-68 winter. There was virtually no winter injury at Dixon Springs.

Plants of 'Thornfree' require support from either single stakes (Fig. 1 or from a 2-wire vertical trellis. The planting of a private grower who planted 18 rooted tips in the spring of 1967, spaced 6 feet apart in the row, yielded 67 quarts in 1968 and 468 quarts in 1969. The plants were set too close together to provide adequate space for mature plants. A plant spacing of 8 to 10 feet apart in rows 10 feet apart is recommended.

'Thornfree' is recommended for home gardens, local markets, and pick-your-own trade for southern Illinois. Although this cultivar has shown very little injury most winters at Urbana, it appears to be about as hardy to winter cold as peach fruit buds and should be covered for winter protection from central Illinois northward for dependable performance.